

---

---

**Safety and control devices for gas  
burners and gas-burning appliances —  
Particular requirements —**

**Part 6:  
Thermoelectric flame supervision  
controls**

iTeh STANDARD PREVIEW

(standards.iteh.ai)  
*Dispositifs de commande et de sécurité pour brûleurs à gaz et  
appareils à gaz — Exigences particulières —*

*Partie 6: Équipements thermoélectriques de surveillance de flamme*

<https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021>



**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

ISO 23551-6:2021

<https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021>



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2021

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
Phone: +41 22 749 01 11  
Email: [copyright@iso.org](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

	Page
<b>Foreword</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>vi</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Classification</b> .....	<b>2</b>
4.1 Classes of controls.....	2
4.2 Groups of controls.....	2
4.3 Types of DC supplied controls.....	2
4.4 Classes of control functions.....	2
<b>5 Test conditions and tolerances</b> .....	<b>3</b>
<b>6 Construction</b> .....	<b>3</b>
6.1 General.....	3
6.2 Construction requirements.....	3
6.2.1 Appearance.....	3
6.2.2 Holes.....	3
6.2.3 Breather holes.....	3
6.2.4 Vent limiter.....	3
6.2.5 Screwed fastenings.....	3
6.2.6 Moving parts.....	3
6.2.7 Sealing caps.....	3
6.2.8 Disassembling and assembling for servicing and/or adjustment for controls.....	3
6.2.9 Auxiliary channels and orifices.....	3
6.2.10 Pre-setting device.....	3
6.3 Materials.....	4
6.4 Connections.....	4
6.4.1 General.....	4
6.4.2 Connection sizes.....	4
6.4.3 Connection types.....	4
6.4.4 Threads.....	4
6.4.5 Union joints.....	4
6.4.6 Flanges.....	4
6.4.7 Compression fittings.....	4
6.4.8 Flare connections.....	4
6.4.9 Nipples for pressure tests.....	4
6.4.10 Strainers.....	4
6.4.11 Gas connections by GQC.....	4
6.5 Gas controls employing electrical components in the gas way.....	4
<b>7 Performance</b> .....	<b>5</b>
7.1 General.....	5
7.2 Leak-tightness.....	5
7.2.1 General.....	5
7.2.2 Requirements.....	5
7.2.3 Test.....	5
7.3 Torsion and bending.....	6
7.4 Rated flow rate.....	6
7.5 Durability.....	6
7.6 Functional requirements.....	6
7.6.1 Operating torque and force.....	6
7.6.2 Interlocks.....	7
7.6.3 Sealing force.....	8
7.6.4 Closing current.....	8

7.7	Endurance.....	8
7.7.1	Requirements.....	8
7.7.2	Endurance test.....	8
7.8	Vibration test.....	9
<b>8</b>	<b>Electrical equipment.....</b>	<b>9</b>
<b>9</b>	<b>Electromagnetic compatibility (EMC).....</b>	<b>10</b>
<b>10</b>	<b>Marking, installation and operation instructions.....</b>	<b>10</b>
10.1	Marking.....	10
10.2	Installation and operating instructions.....	10
10.3	Warning notice.....	10
<b>Annex A</b>	<b>(informative) Leak-tightness test — Volumetric method.....</b>	<b>11</b>
<b>Annex B</b>	<b>(informative) Leak-tightness test — Pressure-loss method.....</b>	<b>12</b>
<b>Annex C</b>	<b>(normative) Conversion of pressure loss into leakage rate.....</b>	<b>13</b>
<b>Annex D</b>	<b>(normative) Gas quick connector (GQC).....</b>	<b>14</b>
<b>Annex E</b>	<b>(normative) Elastomers/requirements resistance to lubricants and gas.....</b>	<b>15</b>
<b>Annex F</b>	<b>(normative) Specific regional requirements in European countries.....</b>	<b>16</b>
<b>Annex G</b>	<b>(normative) Specific regional requirements in Canada and USA.....</b>	<b>17</b>
<b>Annex H</b>	<b>(normative) Specific regional requirements in Japan.....</b>	<b>18</b>
<b>Annex I</b>	<b>(informative) Types of flame supervision controls.....</b>	<b>19</b>

ITEH STANDARD PREVIEW  
(standards.iteh.ai)

[ISO 23551-6:2021](https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021)

<https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html) (standards.iteh.ai)

This document was prepared by Technical Committee ISO/TC 161, *Control and protective devices for gas and/or oil burners and appliances*. [ISO 23551-6:2021](https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-1d90581de1f1/iso-23551-6:2021)

This second edition cancels and replaces the first edition (ISO 23551-6:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- updated to align technically and with the revised format of the latest edition of ISO 23550;
- relocation of specific regional requirements into the main body of the standard that were previously contained in regional annexes.

A list of all parts in the ISO 23551 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is designed to be used in combination with ISO 23550. Together with ISO 23550, this document establishes the full requirements as they apply to the product covered by this document.

Where needed, this document adapts ISO 23550 by stating in the corresponding clause:

- “with the following modification”;
- “with the following addition”;
- “is replaced by the following”; or
- “is not applicable”.

In order to identify specific requirements that are particular to this document, and that are not already covered by ISO 23550, this document can contain clauses or subclauses that are additional to the structure of ISO 23550. These subclauses are indicated by the introductory sentence: “Subclause (or Annex) specific to this document.”

To ensure global relevance of this document, the differing requirements resulting from practical experience and installation practices in various regions of the world have been taken into account. The variations in basic infrastructure associated with gas and/or oil controls and appliances have also been recognized, some of which are addressed in [Annexes F, G and H](#). This document intends to provide a basic framework of requirements that recognize these differences.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[ISO 23551-6:2021](#)

<https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021>

# Safety and control devices for gas burners and gas-burning appliances — Particular requirements —

## Part 6: Thermoelectric flame supervision controls

### 1 Scope

This document specifies safety, constructional, and performance and testing requirements for thermoelectric flame supervision controls, energized by a thermocouple, intended for use with gas burners and gas-burning appliances, hereafter referred to as “controls”.

This document applies to thermoelectric flame supervision controls for gas burners and gas-burning appliances of nominal connection size up to, and including DN 50, that can be used and tested independently of these appliances.

These thermoelectric flame supervision controls are suitable for fuel gases, such as natural gas, manufactured gas or liquefied petroleum gas (LPG) at inlet pressures up to and including 50 kPa. It is not applicable to corrosive and waste gases.

This document covers type testing only.

This document is not applicable to:

- a) the thermocouple; and
- b) controls which use auxiliary energy (e.g. electrical energy supplied externally).

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 23550:2018, *Safety and control devices for gas and/or oil burners and appliances — General requirements*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 23550 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### **thermocouple**

thermoelectric flame sensing element that responds to the temperature of the supervised flame, resulting in an electromotive force (e.m.f.)

### 3.2

#### **thermoelectric flame supervision control**

control which, in response to the e.m.f. produced by the thermocouple, maintains the gas way to the main burner; or the main burner and the pilot burner open and which shuts off the gas way after extinction of the supervised flame

Note 1 to entry: For example, see [Figure I.1](#), [Annex I](#).

### 3.3

#### **ignition interlock**

part which prevents the igniter from operating as long as the main gas way is open

### 3.4

#### **re-start interlock**

mechanism which prevents the re-opening of the gas way to the main burner or to the main burner and the pilot burner until the armature plate has separated from the magnetic element

Note 1 to entry: For further reference, see [Figure I.1](#), [Annex I](#).

### 3.5

#### **sealing force**

force acting on the closure member when the closure member is in the closed position, independent of any force provided by fuel gas pressure

### 3.6

#### **closed position**

position of the closure member(s) in the absence of the thermoelectric energy

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

## 4 Classification

ISO 23551-6:2021

### 4.1 Classes of controls

<https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021>

ISO 23550:2018, 4.1 is replaced by the following:

Controls are classified according to the number of operations:

- Class A: 40 000 operations (e.g. domestic cooking);
- Class B: 10 000 operations (e.g. space heaters);
- Class C: 5 000 operations (e.g. central heating).

Specific regional requirements shall be as given in [Annex E](#), [Annex G](#) and [Annex H](#).

### 4.2 Groups of controls

Shall be according to ISO 23550:2018, 4.2.

Specific regional requirements shall be as given in [Annex E](#), [Annex G](#) and [Annex H](#).

### 4.3 Types of DC supplied controls

Shall be according to ISO 23550:2018, 4.3.

### 4.4 Classes of control functions

Shall be according to ISO 23550:2018, 4.4.



## 5 Test conditions and tolerances

Shall be according to ISO 23550:2018, Clause 5.

## 6 Construction

### 6.1 General

Shall be according to ISO 23550:2018, 6.1 with the following addition.

- Controls shall be designed, so that during ignition, either the gas way to the main burner is open, if there is no pilot burner; or the gas way to the main burner is closed and that to the pilot burner is open.
- Controls shall be designed so that the sealing force is not decreased by the gas inlet pressure.

### 6.2 Construction requirements

#### 6.2.1 Appearance

Shall be in according to ISO 23550:2018, 6.2.1.

#### 6.2.2 Holes

Shall be according to ISO 23550:2018, 6.2.2.

#### 6.2.3 Breather holes

ISO 23550:2018, 6.2.3 is not applicable.

#### 6.2.4 Vent limiter

ISO 23550:2018, 6.2.4 is not applicable.

#### 6.2.5 Screwed fastenings

Shall be according to ISO 23550:2018, 6.2.5.

#### 6.2.6 Moving parts

Shall be according to ISO 23550:2018, 6.2.6.

#### 6.2.7 Sealing caps

Shall be according to ISO 23550:2018, 6.2.7.

#### 6.2.8 Disassembling and assembling for servicing and/or adjustment for controls

Shall be according to ISO 23550:2018, 6.2.8.

#### 6.2.9 Auxiliary channels and orifices

Shall be according to ISO 23550:2018, 6.2.9.

#### 6.2.10 Pre-setting device

Shall be according to ISO 23550:2018, 6.2.10.

### 6.3 Materials

Shall be according to ISO 23550:2018, 6.3.

### 6.4 Connections

#### 6.4.1 General

Shall be according to ISO 23550:2018, 6.4.1.

#### 6.4.2 Connection sizes

Shall be according to ISO 23550:2018, 6.4.2.

#### 6.4.3 Connection types

Shall be according to ISO 23550:2018, 6.4.3.

#### 6.4.4 Threads

Shall be according to ISO 23550:2018, 6.4.4.

#### 6.4.5 Union joints

Shall be according to ISO 23550:2018, 6.4.5.

#### 6.4.6 Flanges

Shall be according to ISO 23550:2018, 6.4.6. [ISO 23551-6:2021  
https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021](https://standards.iteh.ai/catalog/standards/sist/7ee20ac4-9e45-46e3-98bd-d060589d9a21/iso-23551-6-2021)

#### 6.4.7 Compression fittings

Shall be according to ISO 23550:2018, 6.4.7.

#### 6.4.8 Flare connections

Shall be according to ISO 23550:2018, 6.4.8

#### 6.4.9 Nipples for pressure tests

Shall be according to ISO 23550:2018, 6.4.9.

#### 6.4.10 Strainers

Shall be according to ISO 23550:2018, 6.4.10 with the following addition:

Strainers fitted to controls of DN 25 and above shall be accessible for cleaning or replacement without the need to remove the control body by dismantling threaded or welded pipe work.

#### 6.4.11 Gas connections by GQC

Shall be according to ISO 23550:2018, 6.4.11. Further requirements for GQC shall be in accordance with [Annex D](#).

### 6.5 Gas controls employing electrical components in the gas way

ISO 23550:2018, 6.5 is not applicable.

## 7 Performance

### 7.1 General

Shall be according to ISO 23550:2018, 7.1.

### 7.2 Leak-tightness

#### 7.2.1 General

Shall be according to ISO 23550:2018, 7.2.1.

#### 7.2.2 Requirements

ISO 23550:2018, 7.2.2 is replaced by the following.

Controls shall not exceed the air leakage rates given [Table 1](#).

**Table 1 — Maximum leakage rates**

Gas connection nominal inlet size DN	Maximum leakage rates of air cm <sup>3</sup> /h			
	Internal leak-tightness		External leak-tightness	
	Closed (de-energized) position	Ignition position	Operating and closed (de-energized) position	Ignition posi- tion
DN < 10	20	5 000	20	170
10 ≤ DN ≤ 25	40		40	190
25 < DN ≤ 50	60		60	210

Closure parts shall remain leak-tight after dismantling and reassembly.

#### 7.2.3 Test

##### 7.2.3.1 General

Shall be according to ISO 23550:2018, 7.2.3.1. Conversion of pressure loss to leakage rate shall be in accordance with [Annex C](#).

See also Annexes [A](#) and [B](#) for information on leak-tightness tests.

##### 7.2.3.2 Test for external leak-tightness

Shall be according to ISO 23550:2018, 7.2.3.2, with the following addition:

Pressurize the inlet and outlet(s) of the control to the test pressures given in [7.2.3.1](#). Before the test, closure parts which can be dismantled in accordance with [6.2.8](#) shall be dismantled and reassembled five times to the manufacturer's instructions and the leakage rate for each of the mentioned conditions below is measured.

- The control shall be operated such that all closure members in the control are in the open position. Any of the electrical sources can be used during the test. The inlet and outlet(s) of the control shall then be pressurized to the test pressure according to [7.2.3.1](#).
- The test of a) shall then be carried out with the electrical source removed so that the main and pilot gas ways (for protected pilots) in the control are closed.